CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833-2937
Tel 916.920.0300
Fax 916.920.8463

CH2MHILL

July 12, 2004
184288

Mr. William Pfanner
Siting Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814-5504

RE: Data Response, Set 1B
San Francisco Electric Reliability Project (04-AFC-1)

Dear Bill:

On behalf of the City of San Francisco, please find attached 12 copies and one original of the Data Responses, Set 1B, in response to Staff's Data Requests dated June 10, 2004. We are filing copies of this Data Response both electronically and in hard copy.

Please call me if you have any questions.

Sincerely,

CH2M HILL

John L. Carrier

John L. Carrier, J.D.
Program Manager

c: Project File
Proof of Service List

# SAN FRANCISCO ELECTRIC RELIABILITY PROJECT (04-AFC-1)

# DATA RESPONSE, SET 1B

**(Responses to Data Requests: 92 -114)**

Submitted by

## CITY AND COUNTY OF SAN FRANCISCO

July 12, 2004

CH2MHILL

2485 Natomas Park Drive, Suite 600
Sacramento, California 95833-2937

# SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
# (04-AFC-1)
# DATA RESPONSES, SET 1B

**Technical Area: Soil and Water Resources (Water Supply and Recycled Water Treatment)**
**Author:** John C. Scroggs
**SFERP Author**: Jon Loiacono and Steve Brock

## BACKGROUND

Process water for the project is to be provided in a mile-long pipeline that would originate at a new pump structure constructed at an existing combined sewer system structure. Peak day process water demands are estimated at 0.59 MGD (approximately 420 gpm) and average day water demands are estimated at 0.50 MGD (approximately 350 gpm).

## DATA REQUEST

Please provide the following data:

92. The size (diameter) of the combined sewer that would serve as the process water supply source.

    **Response**: The pump station will be served by a 10 foot by 8 foot box sewer.

93. The capacity of combined sewer and the known or estimated peak, average day, and minimum (summer time), flows in the combined sewer.

    **Response:** Dry weather flows are estimated as a peak of 3 million gallons per day (MGD), with an average of greater than 1 MGD. Wet weather flows can be quite high in the 100's of MGDs.

94. The age of the combined sewer that will serve as the supply source.

    **Response:** The sewer system serving the WPS was constructed during the 1950s.

95. The characteristics of the area served by the combined sewer; primarily residential, primarily industrial or mixed?

    **Response:** The combined sewer serves a primarily residential area.

## BACKGROUND

As part of this project, the City of San Francisco proposes to construct a new water supply pump station that would transport the combined sewer water source in a mile-long pipeline to the SFERP site. The pump station is to include three variable frequency drive pumps; two operational and one standby.

96. Provide information on the proposed operation and maintenance of the water supply pumps. Will the SFERP wastewater plant operator also be responsible for the operation and maintenance of these supply pumps? If not, how will the operation and

maintenance of these remote supply pumps be monitored by the SFERP wastewater plant operator? Is a SCADA system proposed to monitor and to cycle the operation of the remote pump station?

**Response:** The SFERP wastewater plant operator will also be responsible for the operation and maintenance of these supply pumps.

A SCADA system is expected to monitor and to control the operation of the remote pump station.

## BACKGROUND

The one-mile water supply pipeline would be constructed north from the water supply pump station at Main Street along Mississippi Street for approximately 480 feet, east along Cesar Chavez Street for approximately 1960 feet, then 1880 feet north on Tennessee Street and then 1360 feet east on 23rd Street to the SFERP treatment facility inlet structure. While a profile of the proposed pipeline route was not provided, it is understood that the water supply pipeline is a force main with high points and low points to overcome elevation differences and conflicts with existing underground structures and utilities along the route.

97. Provide information on air release or combined air release / vacuum release valves proposed at high points and clean outs proposed at pipeline low points.

**Response:** It is anticipated that vacuum/air release valves will be placed at the high points. The pipe has not been laid out in detail. Hence, the precise location of the vacuum/ air release valves cannot be determined. The air release would be momentary.

98. Is odor control proposed at the air release or combination or / vacuum release valves?

**Response:** The water supply pipeline is a force main, which will flow full under pressure most of the time. The air release would be minimum. The force main will follow standard City design practice. Due to the small volume of air released by the vacuum/air release valve, the City does not expect that there will be an odor problem along the pipeline, and hence no odor control is currently proposed for containment of a vacuum/air release. If an odor problem develops, the City could inject chemicals upstream at the pump station or have manhole inserts.

## BACKGROUND

The SFERP recycled water plant is to include primary (solids removal) secondary (activated sludge) and tertiary (filtration and membrane) treatment. Treated water for cooling tower supply may require chemical conditioning. Water used for $N0_x$ suppression injections and compressor evaporative cooling will be treated with a reverse osmosis (R0) system. The R0 product is to be fed to an eletrodeionization system. Disinfection with ultraviolet (UV) light or chlorination systems is proposed.

99. List and describe the physical, biological and chemical treatment processes proposed and describe how system redundancy and reliability is to be provided with equipment breakdowns and during equipment maintenance periods.

**Response:** Process supply water will be pumped from the combined sewer to a traveling screen and then to two Membrane BioReactor (MBR) trains located at the power plant site. Each MBR consists of one aeration tank and one membrane tank. Screened process supply water enters the aeration tanks where it undergoes carbonaceous oxidation and nitrification. This process is accomplished by injecting air through fine bubble diffusers into the water, which provides oxygen for the biological oxidation. The air is also used to mix the tank contents to keep the solids in suspension. Ferric chloride (a coagulant) is also added at this stage to provide phosphorus precipitation. The mixed liquor (ML) is then pumped to the membrane tanks. Once there, the ML is filtered through immersed membranes using pumps that operate under negative pressure. Within the membrane tanks, air is applied at the bottom of the membrane modules to 1) provide process aeration and mixing of biomass, and 2) scour the membrane surface as needed to reduce fouling. ML between the aeration and membrane tanks is re-circulated using pumps to ensure intimate contact of the water with the biomass. Solids, including phosphorus and bacteria, are rejected by the membrane system. Some of the retained ML will be removed from the system to maintain mixed liquor suspended solids (MLSS) levels. The removed sludge will be pumped from the aeration tanks through submersible pumps and discharged to the sewer system. After going through the MBR system for nitrification, organics and phosphorus removal and filtration, effluent will enter a single channel ultraviolet (UV) radiation system for disinfection. Three banks of lights mounted horizontally and parallel to the flow will emit a sufficient dose of UV radiation to inactivate pathogens and meet the appropriate State water reclamation criteria. Redundant units are an option and will be considered during the detail design phase. In addition, the SFERP will not normally be run 24 hours a day, 7 days a week. However, the recycle water plant will operate 24/7 albeit at reduced capacity under some conditions. A recycle water storage tank would enhance the reliability of the system as a whole and introduce some degree of flexibility in recycle plant operation. The final most cost effective solution will be developed during design. Under the described operating modes, at times it may be necessary to discharge recycle water back into the combined sewer system if the storage tank is full.

100. Describe how the recycled water treatment system is to be controlled and monitored. Provide information on operational and chemical control systems. Are sampling systems proposed which will maintain quality levels within high and low tolerances (set points)? Are alarm (and system shut downs) proposed when plant operation or effluent quality test results are not within acceptable ranges?

**Response:** The plant will be fully automated. However, there will need to be operation and maintenance personnel on site to run and maintain the plant, in particular, the cleaning-in-place of the membranes with sodium hypochlorite and sodium hydroxide. It is expected that, once the proper dosages are determined, the chemical control systems

will be flow paced. It is also anticipated that the system will be operated at slowly changing flow rates and that the storage system will be used to make up differences between supply and demand. There will need to be sampling to determine how well the process is performing. There will also be alarms. Parameters such as pH and turbidity will be monitored on line and an alarm will activate when the readings are out of the set points.

## BACKGROUND

Storage of water treated by the SFERP recycled water treatment plant is proposed. This stored water would be used to meet fluctuations in process water demands and to provide backwash water supply for proposed filtration and membrane processes.

101. Provide information on the proposed capacity of the treated water storage tank.

**Response:** The recycled (treated) water storage is proposed to be 600,000 gallons. This volume represents roughly 24 hours of recycled water production and would supply the plant for 36 hours at its maximum daily consumption (Please see Table 8.14-6 in the AFC).

## BACKGROUND

Chemicals are proposed for the treatment of water to be used for cooling water supply (pH control, mineral scale dispersant, corrosion inhibitor, biocide).

102. Provide a complete list of water treatment chemicals proposed.

**Response:** The preliminary selection of cooling tower chemicals is:

- Sulfuric Acid for pH control
- Bleach for biocide control
- Dispersant/corrosion inhibitor (some chemical suppliers, e.g. GE Betz, accomplish both requirements with a single chemical)

Based on the preliminary determination of the recycle water chemistry, the above list of chemicals should be adequate for maintaining the proper cooling water chemistry. These may be modified during the final design of the project.

103. Provide Material Safety Data Sheets (MSDS) for all water conditioning chemicals proposed.

**Response:** The MSDS for sulfuric acid and bleach are provided as Attachment S&W-103. If the dispersant and corrosion inhibitor are combined into a single product, then a product such as GE Betz DIANODIC may be utilized (see Attachment S&W-103 for the MSDS). Although the final cooling water chemistry design may not include sodium bromide, the MSDS has been included for reference in Attachment S&W-103. If separate

dispersant and corrosion inhibitors are used, then products similar to NALCO TRASAR 23263 and NALCO 8305 PLUS, respectively, may be used. Please see Data Response HM-28 for MSDS's for these products.

104. Provide the volume of the chemical containers, the spill containment systems and the capacity (in days of average plant operation) that each chemical container is to provide.

**Response:** The volume of the dispersant/corrosion control chemical, GE Betz DIANODIC, is expected to be a 400 gallon container or 73 days of maximum continuous operation. For the sulfuric acid, the volume is expected to be a 400 gallon container or 7 days of maximum continuous operation. It is expected that the bleach volume will also be a 400 gallon container (rather than the 870 gallons as originally shown in Table 8.12-4) which provides 33 days of maximum continuous operation. Under a period of daily operation (rather than continuous), the preceding estimated days of chemical storage may double or be even longer.

These chemical totes will be mounted above a concrete containment tank. For the sulfuric acid, the expected containment volume will be approximately 75 cubic feet. The bleach and DIANODIC will share a common spill containment whose volume is expected to be approximately 100 cubic feet.

105. Where are chemicals to be stored: in covered storage areas or in uncovered areas?

**Response:** The chemicals will be stored outdoors in order to reduce exposure risks to workers. Given the limited number of days of intense sunshine in San Francisco, the City has not yet determined that a sunshade would be necessary; however, the City would not oppose such a requirement. The chemicals will be stored within the plant, which is secure, near the chillers/cooling towers.

106. In general, water and wastewater system chemicals are added in proportion to flow. Provide information on proposed chemical dosage control systems. Are sampling systems proposed which will maintain chemical concentrations within high and low tolerances (set points)? Are alarms (and systems shut down?) proposed in the event that chemical concentrations exceed the allowable range?

**Response:** Since this facility will be manned on a 24-hour basis, it is expected that the cooling water chemistry control can be performed in a manner typical for a peaking plant. The cooling water chemistry would be monitored by analyzing samples taken manually per the established sampling schedule. The frequency of sampling will be developed as the plant gains experience with the cooling tower duty cycles as well as the behavior of the cooling tower with recycled water. Each chemical feed system would have dedicated metering pumps that would be adjusted based on the results of the sample analysis. This facility will be fairly unique in that there will be onsite production of the recycle water and as a result the operators will have available to them recycle water production histories to aid in developing the proper chemistry in the cooling towers.

Since the feed to the cooling towers will be from the recycle water storage tank, the makeup water chemistry will not vary widely over a short period of time. This stable

consistency of the makeup water chemistry will allow for a chemical control program based on manual sampling and would probably only require an automated alarm on the TDS level in the towers.

## BACKGROUND

The recycled water treatment plant would include numerous pumps and power driven process systems. Standby power should be provided to operate critical supply and treatment units in the event of a power failure.

107. Provide the horsepower demands for all critical water supply and recycled water treatment pumping and process equipment.

**Response:** Based on the preliminary system design, the following table shows the estimated equipment horsepower for the Water Pumping Station (WPS) and the recycle water treatment facility:

| Equipment | Horsepower |
|---|---|
| **WPS** | |
| Transfer pumps | 15.6 |
| **Recycle Water Treatment Plant** | |
| Traveling Screen | 1.6 |
| Water Wash | 0.8 |
| Odor Control | 12.0 |
| Secondary Treatment Air Blower | 41.0 |
| Odor Control | 8.0 |
| ZeeWeed (or equal) | |
| Permeate Pump | 4.7 |
| Membrane air scour | 31.4 |
| Receiver pump | 7.5 |
| Odor Control | 12.0 |
| Building ventilation | 7.6 |

108. What plans have been made to provide a standby power system adequate to start and operate these critical units during an outage as part of the proposed SFERP recycled water treatment plant. Please provide a description of the power supply for the water supply pump station and evaluate the possibility of including a permanent or portable standby power system to serve the remote water supply pump station.

**Response:** The water pump station will be fed from the local power provided by PG&E. Thus reliability of electric service to the pump station will be the same reliability that is currently experienced by the city. Long periods (several hours or longer) of power outage are almost entirely due to unusual and infrequent events. In the unlikely event that the local power outage at the pump station were to last several days and the power plant were to exhaust its water tanks, then the plant would utilize city potable water until the power could be restored and the production of recycled water initiated.

A power loss to the recycle water treatment plant also means that the electrical system would be down. In these circumstances, the power plant could not export power and would not be operating. Under this circumstance, the power plant would not require the production of any recycled water.

## BACKGROUND

The SFERP recycled water treatment plant is to be housed in a pre-engineered building. Odors are to be removed through an activated carbon absorption system and ventilated to the atmosphere. Up to 15 air charges per hour is proposed.

109. What is the distance to the nearest sensitive receptor (residence, public area, school etc.)?

**Response:** As described in Sections 8.6.3 and 8.12.3 of the Application for Certification for the San Francisco Electric Reliability Project submitted on March 19, 2004, the nearest receptor is the Warm Water Cove Public Access area, a park located approximately 300 feet south of the project site. The nearest school is Daniel Webster Elementary School located approximately 3,000 feet to the northwest. The nearest day care facility is San Francisco Head Start, located approximately 4,000 feet to the west. The nearest hospital/long-term health care facility is the San Francisco General Hospital located approximately 5,300 feet to the west. The nearest residence is located on Third Street between 22nd and 23rd streets, approximately 600 feet northwest of the project site.

110. What reliability measures are proposed (backup units, redundancy) during period when the odor control system is being repaired or fails?

**Response:** The odor control system will include two units, one for duty and one for backup.

111. Would all odors be removed. If not what would remain?

**Response:** All anticipated odors will be removed.

## BACKGROUND

During emergency water supply or recycled water treatment plant shutdown conditions, potable water is proposed as backup supply.

112. What is the expected frequency and duration and amount of potable water use?

**Response:** The only predicted potable water usage will be for "domestic" uses such as drinking, bathing, or cooking. This will be intermittent and should not amount to more than a one-gpm daily average. Should there be an unexpected, extended curtailment of recycled water production, then the plant will be designed to operate on city potable water. Since this occurrence is highly unlikely, the frequency and duration of using potable water for the raw water supply cannot be predicted.

113. Describe cross connection controls proposed to protect the potable water system from contamination by the recycled water system.

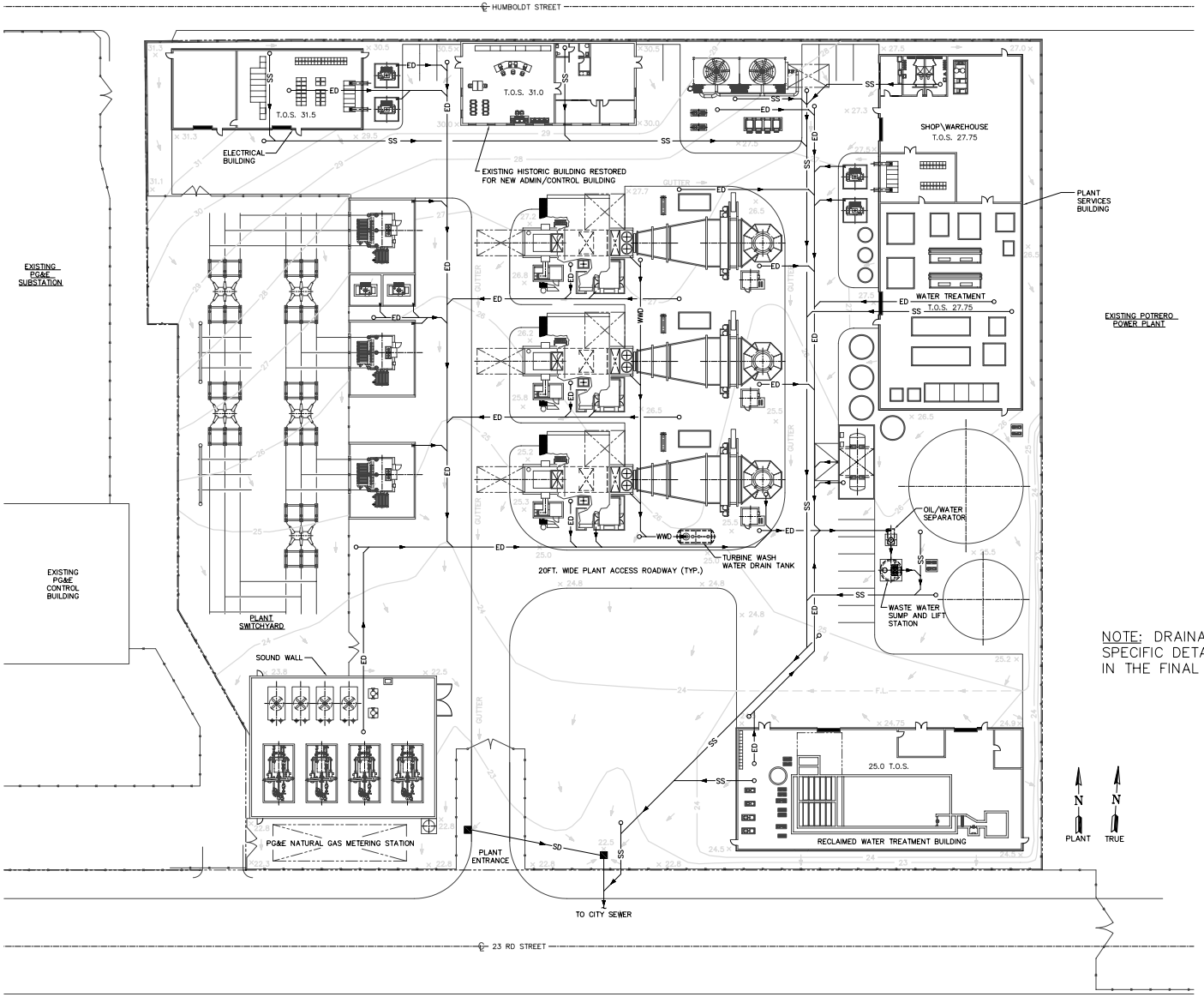
**Response:** Per California Health Laws, Title 17, Article 2, Protection of Water System, an air gap protection will be instituted to prevent contamination of the potable water system. This air gap will separate the potable water system at a discharge point into the recycle water storage tank.

## BACKGROUND

According to the AFC miscellaneous general plant drains will collect area washdown, sample drains, equipment leakage, and drainage from facility equipment areas. Water from these areas will be collected in a system of floor drains, hub drains, sumps and piping and routed to the combined storm sewer collection system. Drains that potentially could contain oil or grease will first be routed through an oil / water separator.

114. To evaluate how stormdrain water and washdown water is to be contained and discharged to the combined sewer provide an onsite water/wastewater/stormwater piping plan at a scale of 1″ = 40′ or larger. Label drain pipes, identify pipe sizes and, pumping facilities as necessary.

**Response:** A preliminary schematic design has been developed to demonstrate the approach for collection of the site drainages. The sizes and depths of the lines will be developed during the detail design phase. Refer to Figure S&W-114 for the drainage plan.




**LEGEND:**

| | |
|---|---|
| ■ | STORM WATER CATCH BASIN |
| ○ | CLEANOUT AT END OF DRAIN RUN |
| ED | EQUIPMENT DRAIN |
| SD | STORM WATER DRAIN |
| SS | SANITARY SEWER |
| WWD | TURBINE WASH WATER DRAIN |

NOTE: DRAINAGE PIPING SHOWN IS CONCEPTUAL. SPECIFIC DETAILS AND LAYOUT WILL BE DETERMINED IN THE FINAL DESIGN.

| SYMBOL | DATE | REVISION DESCRIPTION | DRAWN | APP'D |
|---|---|---|---|---|
| A | 6-24-04 | PRELIMINARY ISSUE FOR REVIEW | | |

SOURCE: PB Power, Inc.

**SITE UTILITIES DRAINAGE PIPING - PLAN**
SCALE: 1"=20'-0"

GRAPHIC SCALE
1" = 20'-0"
0' 10' 20' 30' 40' 50' 60'

**FIGURE S&W-114**
**PRELIMINARY SCHEMATIC DRAINAGE DESIGN**
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

D062004008RDD_02 (6/30/04)

**SAN FRANCISCO ELECTRIC RELIABILITY PROJECT**
**(04-AFC-1)**
**DATA RESPONSES, SET 1B**

**ATTACHMENT S&W-103**

# Water Conditioning Chemical MSDS's

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 30-OCT-2001

**EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940**

## 1 PRODUCT IDENTIFICATION

PRODUCT NAME:

**DIANODIC DN2300**

PRODUCT APPLICATION AREA:

**WATER-BASED DEPOSIT CONTROL AGENT.**

## 2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

## 3 HAZARDS IDENTIFICATION

**********

**EMERGENCY OVERVIEW**

**CAUTION**

Non-hazardous to skin. May cause slight irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: Slight; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinquishing media: dry chemical, carbon dioxide, foam or water

**********

**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**
Primary route of exposure; Non-hazardous to skin.

**ACUTE EYE EFFECTS:**
May cause slight irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**
Mists/aerosols may cause irritation to upper respiratory tract.

**INGESTION EFFECTS:**
May cause slight gastrointestinal irritation.

**TARGET ORGANS:**
No evidence of potential chronic effects.

**MEDICAL CONDITIONS AGGRAVATED:**
Not known.

**SYMPTOMS OF EXPOSURE:**
May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

## 4 FIRST AID MEASURES

**SKIN CONTACT:**
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

**EYE CONTACT:**
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

**INHALATION:**
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

**NOTES TO PHYSICIANS:**
No special instructions

## 5 FIRE FIGHTING MEASURES

**FIRE FIGHTING INSTRUCTIONS:**
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**
dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**
Thermal decomposition (destructive fires) yields elemental oxides.

**FLASH POINT:**
> 200F > 93C P-M(CC)

## 6 ACCIDENTAL RELEASE MEASURES

**PROTECTION AND SPILL CONTAINMENT:**
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

## 7 HANDLING & STORAGE

**HANDLING:**
Normal chemical handling.

**STORAGE:**
Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

**EXPOSURE LIMITS**

This product is not hazardous as defined by OSHA regulations.

**ENGINEERING CONTROLS:**
adequate ventilation

**PERSONAL PROTECTIVE EQUIPMENT:**
Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

**SKIN PROTECTION:**
Use of gloves made of rubber or synthetic material is optional. Wash off after each use. Replace as necessary.

**EYE PROTECTION:**
splash proof chemical goggles

## 9 PHYSICAL & CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| Specific Grav.(70F,21C) | 1.169 | Vapor Pressure (mmHG) | ~ 18.0 |
| Freeze Point (F) | 25 | Vapor Density (air=1) | < 1.00 |
| Freeze Point (C) | -4 | | |
| Viscosity(cps 70F,21C) | 42 | % Solubility (water) | 100.0 |

| | |
|---|---|
| Odor | Slight |
| Appearance | Yellow |

| | | |
|---|---|---|
| Physical State | | Liquid |
| Flash Point | P-M(CC) | > 200F > 93C |
| pH As Is (approx.) | | 5.2 |
| Evaporation Rate (Ether=1) | | < 1.00 |

**NA = not applicable ND = not determined**

## 10 STABILITY & REACTIVITY

**STABILITY:**
Stable under normal storage conditions.
**HAZARDOUS POLYMERIZATION:**
Will not occur.
**INCOMPATIBILITIES:**
May react with strong oxidizers.
**DECOMPOSITION PRODUCTS:**
Thermal decomposition (destructive fires) yields elemental oxides.
**INTERNAL PUMPOUT/CLEANOUT CATEGORIES:**
"A"

## 11 TOXICOLOGICAL INFORMATION

| | |
|---|---|
| Oral LD50 RAT: | >5,000 mg/kg |
| Dermal LD50 RABBIT: | >2,000 mg/kg |
| Skin Irritation Score RABBIT: | 0.3 |
| NOTE - Value is for testing of a similar material | |
| Eye Irritation Score RABBIT: | 2.0 |
| NOTE - Value is for testing of a similar material; completely reversible by 72 hrs. | |

## 12 ECOLOGICAL INFORMATION

**AQUATIC TOXICOLOGY**
Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 1767; No Effect Level= 1250 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 1960; No Effect Level= 313 mg/L
Mysid Shrimp 48 Hour Static Renewal Bioassay (pH adjusted)
10% Mortality= 16000; 0% Mortality= 8000 mg/L
Sheepshead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
0% Mortality= 16000 mg/L

**BIODEGRADATION**
BOD-28 (mg/g): 32
BOD-5 (mg/g): 10
COD (mg/g): 368
TOC (mg/g): 144

## 13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from

federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 TRANSPORT INFORMATION

| | |
|---|---|
| DOT HAZARD: | Not Applicable |
| UN / NA NUMBER: | Not applicable |
| DOT EMERGENCY RESPONSE GUIDE #: | Not applicable |

## 15 REGULATORY INFORMATION

**TSCA:**
All components of this product are listed in the TSCA inventory.

**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**
No regulated constituent present at OSHA thresholds

**FOOD AND DRUG ADMINISTRATION:**
FDA APPROVED FOR MILL SUPPLY WATER

**USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:**
SEC.G5,G7

**SARA SECTION 312 HAZARD CLASS:**
Product is non-hazardous under Section 311/312

**SARA SECTION 302 CHEMICALS:**
No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**
No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:**

No regulated constituent present at OSHA thresholds

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

## 16 OTHER INFORMATION

| NFPA/HMIS | | CODE TRANSLATION |
|---|---|---|
| Health | 0 | Minimal Hazard |
| Fire | 1 | Slight Hazard |
| Reactivity | 0 | Minimal Hazard |
| Special | NONE | No special Hazard |
| (1) Protective Equipment | B | Goggles,Gloves |

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**CHANGE LOG**

| | EFFECTIVE DATE | REVISIONS TO SECTION: | SUPERCEDES |
|---|---|---|---|
| MSDS status: | 29-JAN-1997 | | ** NEW ** |
| | 08-MAY-1997 | 15 | 29-JAN-1997 |
| | 10-SEP-1997 | 3,8,10,11,16;EDIT:4 | 08-MAY-1997 |

| | | |
|---|---|---|
| 10-NOV-1997 | 15 | 10-SEP-1997 |
| 06-FEB-1998 | 12 | 10-NOV-1997 |
| 30-OCT-2001 | 4 | 06-FEB-1998 |

# Material Safety Data Sheet

# Sulfuric Acid

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Sulfuric Acid

**OTHER/GENERIC NAMES:** Battery acid

**PRODUCT USE:** Industrial

**MANUFACTURER:** General Chemical Corporation
90 East Halsey Road
Parsippany, NJ 07054

**FOR MORE INFORMATION CALL:** 973-515-1840
(Monday-Friday, 9:00am-4:30pm)

**IN CASE OF EMERGENCY CALL:** 800-631-8050
(24 Hours/Day, 7 Days/Week)

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT NAME | CAS NUMBER | WEIGHT % |
|---|---|---|
| Sulfuric acid | 7664-93-9 | >51 |
| Water | 7732-18-5 | Balance |

Trace impurities and additional material names not listed above may appear in Section 15 of this MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

**OSHA Hazard Communication Standard:** *This product is considered hazardous under the OSHA Hazard Communication Standard.*

## 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** Oily, colorless to slightly yellow, clear to turbid liquid. Odorless. Causes severe skin burns. Causes severe eye burns. Causes burns of the mouth, throat, and stomach.

**POTENTIAL HEALTH HAZARDS**

**SKIN:** Causes severe burns.

**EYES:** Liquid contact can cause irritation, corneal burns, and conjunctivitis. May result in severe or permanent injury. May cause blindness.

**INHALATION:** Inhalation of fumes or acid mist can cause irritation or corrosive burns to the upper respiratory system, including the nose, mouth and throat. May irritate the lungs. May cause pulmonary edema.

**INGESTION:** Causes burns of the mouth, throat and stomach. May be fatal if swallowed. Hazards are also applicable to dilute solutions.

**DELAYED EFFECTS:** Erosion of teeth, lesions of the skin, tracheo-bronchitis, mouth inflammation, conjuctivitis and gastritis.IARC and NTP have classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen. This classification is for inorganic acid mists only and does not apply to sulfuric acid or sulfuric acid solutions. The basis for the classifications rests on several epidemiology studies which have several deficiencies. These studies did not account for exposure to other substances, some known to be animal or potential human carcinogens, social influences (smoking or alcohol consumption) and included small numbers of subjects. Based on the overall weight of evidence from all human and chronic animal studies, no definitive causal relationship between sulfuric acid mist exposure and respiratory tract cancer has been shown.

**Ingredients found on one of the three OSHA designated carcinogen lists are listed below.**

| INGREDIENT NAME | NTP STATUS | IARC STATUS | OSHA LIST |
|---|---|---|---|
| Sulfuric acid | Known carcinogen – sulfuric acid mist | 1-Known carcinogen – sulfuric acid mist | Not listed |

## 4. FIRST AID MEASURES

**SKIN:** Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing while washing. Get medical attention immediately.

**EYES:** Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

**INHALATION:** If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

**INGESTION:** If swallowed, do NOT induce vomiting. Give victim two glasses of water. Call a physician immediately. Never give anything by mouth to an unconscious person.

**ADVICE TO PHYSICIAN:** Treat symptomatically.

## 5. FIRE FIGHTING MEASURES

**FLAMMABLE PROPERTIES**

| | |
|---|---|
| **FLASH POINT:** | Not applicable. |
| **FLASH POINT METHOD:** | Not applicable. |
| **AUTOIGNITION TEMPERATURE:** | Not applicable. |
| **UPPER FLAME LIMIT (volume % in air):** | Not applicable. |
| **LOWER FLAME LIMIT (volume % in air):** | Not applicable. |
| **FLAME PROPAGATION RATE (solids):** | Not applicable. |
| **OSHA FLAMMABILITY CLASS:** | Not flammable. |

**EXTINGUISHING MEDIA:**

Water spray or fog may be used to knock down corrosive vapor cloud. Water may be applied to the sides of the containers exposed to flames provided the water does not come in contact with the tank contents.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:**

Flammable and potentially explosive hydrogen gas can be generated inside metal drums and storage tanks. Concentrated sulfuric acid can ignite combustible materials on contact.

**SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:**

Do not use solid water streams near ruptured tanks or spills of sulfuric acid. Acid reacts violently with water and can spatter acid onto personnel. Wear approved positive-pressure self-contained breathing apparatus and protective clothing.

## 6. ACCIDENTAL RELEASE MEASURES

**IN CASE OF SPILL OR OTHER RELEASE:** (See section 8 for recommended personal protective equipment.)

Dilute small spills or leaks cautiously with plenty of water. Neutralize residue with sodium bicarbonate or other suitable neutralizing agent. When using carbonates for neutralization, adequate precautions should be taken to minimize hazards from carbon dioxide gas generation. No smoking in spill area. Major spills must be handled by a predetermined plan. Attempt to keep out of sewers.

**Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.**

## 7. HANDLING AND STORAGE

**NORMAL HANDLING:** (See section 8 for recommended personal protective equipment.)

Avoid contact with skin, eyes and clothing. Avoid breathing mist. Use appropriate personnel protective equipment. Do not add water to acid. When diluting, always add acid to water cautiously and with agitation. Use with adequate ventilation.

**STORAGE RECOMMENDATIONS:**

Protect from physical damage. Store in a cool, well-ventilated area away from combustibles and reactive chemicals. Keep out of sun and away from heat. Keep containers upright. No smoking in storage area.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**ENGINEERING CONTROLS:**

Sufficient to reduce vapor and acid mists to permissible levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems. Corrosion-proof construction recommended. Closed ventilation systems (e.g. vapor hoods) are frequently used in the electronics industry.

**PERSONAL PROTECTIVE EQUIPMENT**

**SKIN PROTECTION:** As a minimum, wear acid-resistant, preferably rubber, gloves and apron. Acid resistant boots, trousers and jacket may be used for increased protection.

**EYE PROTECTION:** Wear chemical safety goggles. Add a full faceshield for pouring liquids. Do not wear contact lenses.

**RESPIRATORY PROTECTION:** Generally, none required. If misting conditions prevail, wear a NIOSH-approved acid-mist respirator.

**ADDITIONAL RECOMMENDATIONS:** Provide eyewash stations and quick-drench shower facilities in or near areas of use or handling.

**EXPOSURE GUIDELINES**

| INGREDIENT NAME | ACGIH TLV | OSHA PEL | OTHER LIMIT |
|---|---|---|---|
| Sulfuric acid | 1 mg/m$^3$ – TWA<br>3 mg/m$^3$ – STEL | 1 mg/m$^3$ – TWA | 15 mg/m$^3$ - IDLH |

[1] = Limit established by General Chemical Corporation.
[2] = Workplace Environmental Exposure Level (AIHA).
[3] = Biological Exposure Index (ACGIH).

**OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:**
None.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Colorless to light yellow liquid
**PHYSICAL STATE:** Liquid
**MOLECULAR WEIGHT:** 98.08 ($H_2SO_4$)
**CHEMICAL FORMULA:** $H_2SO_4$ (various concentrations) in water
**ODOR:** Odorless
**SPECIFIC GRAVITY (water = 1.0):** 1.842
**SOLUBILITY IN WATER (weight %):** 100%
**pH:** 0.9 (1% solution)
**BOILING POINT:** ~310C (94%)
**MELTING POINT:** ~ -27C (94%)
**VAPOR PRESSURE:** <0.001 mm Hg @ 20C
**VAPOR DENSITY (air = 1.0):** Not applicable
**EVAPORATION RATE:** Not applicable **COMPARED TO:** Not applicable
**% VOLATILES:** Not applicable
**FLASH POINT:** Not applicable
(Flash point method and additional flammability data are found in Section 5.)

## 10. STABILITY AND REACTIVITY

**NORMALLY STABLE? (CONDITIONS TO AVOID):**
Normally stable. Avoid temperatures greater than 300C: yields sulfur trioxide gas, which is toxic, corrosive,and an oxidizer.

**INCOMPATIBILITIES:**
Nitro compounds, carbides, dienes, alcohols (when heated): causes explosions.
Oxidizing agents, such as chlorates and permanganates: causes fires and possible explosions.
Allyl compounds and aldehydes: undergoes polymerization, possibly violent.
Alkalies, amines, water, hydrated salts, carboxylic acid anhydrides, nitriles, olefinic organics, glycols, aqueous acids: causes strong exothermic reactions.

Carbonates, cyanides, sulfides, sulfites, metals such as copper: yields toxic gases.

**HAZARDOUS DECOMPOSITION PRODUCTS:**
Sulfur trioxide gas.

**HAZARDOUS POLYMERIZATION:**
Will not occur.

## 11. TOXICOLOGICAL INFORMATION

**IMMEDIATE (ACUTE) EFFECTS:**
$LD_{50}$ (oral-rat): 2140 mg/kg
$LC_{50}$ (inhl-rat): 510 mg/$m^3$/2 hr
$LC_{50}$ (inhl-mouse): 320 mg/$m^3$/2 hr

**DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:**
IARC and NTP have classified "strong inorganic acid mists containing sulfuric acid" as known human carcinogens. The state of California has also listed "strong inorganic acid mists containing sulfuric acid" on the Proposition 65 list as a cancer causing agent. No definitive causal relationship between sulfuric acid mist exposure and respiratory cancer has been shown.

**OTHER DATA:**
None.

## 12. ECOLOGICAL INFORMATION

24.5 ppm/24 hr./bluegill/lethal/fresh water
42.5 ppm/48 hr./prawn/$LC_{50}$/salt water

## 13. DISPOSAL CONSIDERATIONS

**RCRA**

**Is the unused product a RCRA hazardous waste if discarded?** Yes

**If yes, the RCRA ID number is:** D002

**OTHER DISPOSAL CONSIDERATIONS:**

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

## 14. TRANSPORT INFORMATION

**US DOT HAZARD CLASS:** 8, PG II
**US DOT ID NUMBER:** UN1830
**PROPER SHIPPING NAME:** Sulfuric acid

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

## 15. REGULATORY INFORMATION

**TOXIC SUBSTANCES CONTROL ACT (TSCA)**

**TSCA INVENTORY STATUS:** Listed on the TSCA Inventory.

**OTHER TSCA ISSUES:** None.

**SARA TITLE III/CERCLA**

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

| INGREDIENT NAME | SARA/CERCLA RQ (lb) | SARA EHS TPQ (lb) |
|---|---|---|
| Sulfuric acid | 1000 | 1000 |

**Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.**

**SECTION 311 HAZARD CLASS:** Immediate.

**SARA 313 TOXIC CHEMICALS**:
The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percents are found in Section 2.

| INGREDIENT NAME | COMMENT |
|---|---|
| Sulfuric acid | None |

**STATE RIGHT-TO-KNOW**

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

| INGREDIENT NAME | WEIGHT % | COMMENT |
|---|---|---|
| No ingredients listed in this section. | | |

**ADDITIONAL REGULATORY INFORMATION:**
"Strong inorganic acid mists containing sulfuric acid" has been listed on California Proposition 65 as a cancer-causing agent.

**WHMIS CLASSIFICATION (CANADA):**
Listed on Canadian DSL and EU EINECS.

**FOREIGN CHEMICAL CONTROL INVENTORY STATUS:**
Listed on the Canadian DSL and EU EINECS.

## 16. OTHER INFORMATION

**CURRENT ISSUE DATE:** May, 2003

**PREVIOUS ISSUE DATE:** November, 2001

**CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:**
Addition of Prop 65 listing.

**OTHER INFORMATION:** None

**MATERIAL SAFETY DATA SHEET**

PRODUCT

# STABREX® ST40

**EMERGENCY TELEPHONE NUMBER(S)**

**(800) 424-9300 (24 Hours) CHEMTREC**

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **STABREX® ST40**

APPLICATION : MICROORGANISM CONTROL CHEMICAL

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

**EMERGENCY TELEPHONE NUMBER(S)** : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

| Hazardous Substance(s) | CAS NO | % (w/w) |
|---|---|---|
| Sodium Hydroxide | 1310-73-2 | 1.0 - 5.0 |

## 3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

**DANGER**
CORROSIVE. CAUSES SEVERE EYE AND SKIN INJURY. HARMFUL IF INHALED. HARMFUL IF SWALLOWED.
Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :
Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :
Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
No adverse effects expected other than those mentioned above.

## 4. FIRST AID MEASURES

EYE CONTACT :
Get immediate medical attention. PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open.

SKIN CONTACT :
Get immediate medical attention. Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :
Get immediate medical attention. DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Call a physician.

IF ON SKIN: Immediately wash with soap and plenty of water. Remove contaminated clothing and wash before reuse. Get medical attention if irritation persists.

IF SWALLOWED: Drink large quantities of water. Do not induce vomiting. Call a physician or poison control immediately.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

## 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Contain and absorb with sand or vermiculite and mix well. Collect up and remove to a safe place until disposal. Wash site of spillage thoroughly with water. Assistance can be obtained from waste disposal companies. LARGE SPILLS: Dike to prevent further movement. Recover by pumping or by using a suitable absorbent. Reclaim into recovery or salvage drums. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Apply this pesticide only as specified on the label.

## 7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store the containers tightly closed. Store separately from acids. Store in a cool well ventilated area away from direct sunlight.

UNSUITABLE CONSTRUCTION MATERIAL :
This product is corrosive to mild steel., Brass, Stainless steel, Buna-N, EPDM

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)
Sodium Hydroxide CEILING: 2 mg/m3

OSHA/PEL :
Substance(s)
Sodium Hydroxide CEILING: 2 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. A particulate cartridge may be used.

HAND PROTECTION :
PVC gloves, Rubber gloves, Neoprene gloves, Nitrile gloves, Butyl gloves, Viton# gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| PHYSICAL STATE | Liquid |
| APPEARANCE | Clear Light yellow |
| ODOR | None |
| SPECIFIC GRAVITY | 1.32 - 1.36 @ 77 °F / 25 °C |
| DENSITY | 11.0 - 11.3 lb/gal |
| SOLUBILITY IN WATER | Complete |
| pH (100 %) | 13 |
| FREEZING POINT | 17 °F / -8.3 °C |
| VAPOR PRESSURE | 7.7 mm Hg @ 77 °F / 25 °C 115 mm Hg @ 115 °F / 46 °C |
| VOC CONTENT | 0.00 % |

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
High temperatures Direct sunlight

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes. Do not mix with any sodium hypochlorite or bleach product. Resulting mixture will result in a violent exothermic reaction releasing large amounts of nitrogen gas and liquid sulfuric acid.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Chlorine gas, HCl, Bromine, Hydrogen bromide, Oxides of nitrogen

## 11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

| Species | LD50 | Test Descriptor |
|---|---|---|
| Rat | > 5,000 mg/kg | Similar Product |

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

| Draize Score | Test Descriptor |
|---|---|
| 7.9 / 8.0 | Similar Product |

Rating : Extremely irritating (Corrosive)

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

## 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

| Species | Exposure | LC50 | Test Descriptor |
|---|---|---|---|
| Rainbow Trout | 96 hrs | 4.5 mg/l | Product |
| Sheepshead Minnow | 96 hrs | 16 mg/l | Product |
| Fathead Minnow | 96 hrs | 8.3 mg/l | Product |

Rating : Toxic

ACUTE INVERTEBRATE RESULTS :

| Species | Exposure | LC50 | EC50 | Test Descriptor |
|---|---|---|---|---|
| Daphnia magna | 48 hrs | 4.2 mg/l | 4.2 mg/l | Product |
| Mysid Shrimp (Mysidopsis bahia) | 96 hrs | 27 mg/l | | Product |
| Ceriodaphnia dubia | 48 hrs | 1.6 mg/l | | Product |

Rating : Toxic

CHRONIC INVERTEBRATE RESULTS :

| Species | Test Type | IC25 | End Point | Test Descriptor |
|---|---|---|---|---|
| Ceriodaphnia dubia | 3 Brood | 15.6 mg/l | Reproduction | Product |

PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water | Soil/Sediment |
|---|---|---|
| <5% | 30 - 50% | 30 - 50% |

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

## 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

METAL CONTAINERS: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. ^PLASTIC CONTAINERS: Do not reuse empty container. Triple rinse (or equivalent). Then puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

| | |
|---|---|
| Proper Shipping Name : | CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. |
| Technical Name(s) : | SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL |
| UN/ID No : | UN 3266 |
| Hazard Class - Primary : | 8 |
| Packing Group : | II |
| Flash Point : | None |
| DOT Reportable Quantity (per package) : | 35,000 lbs |
| DOT RQ Component : | SODIUM HYDROXIDE |

AIR TRANSPORT (ICAO/IATA) :

| | |
|---|---|
| Proper Shipping Name : | CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. |
| Technical Name(s) : | SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL |
| UN/ID No : | UN 3266 |
| Hazard Class - Primary : | 8 |
| Packing Group : | II |
| IATA Cargo Packing Instructions : | 812 |
| IATA Cargo Aircraft Limit : | 30 L (Max net quantity per package) |

MARINE TRANSPORT (IMDG/IMO) :

| | |
|---|---|
| Proper Shipping Name : | CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. |
| Technical Name(s) : | SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL |
| UN/ID No : | UN 3266 |
| Hazard Class - Primary : | 8 |
| Packing Group : | II |

## 15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hydroxide : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

| RQ Substance | RQ |
|---|---|
| Sodium Hydroxide | 35,000 lbs |

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

| | |
|---|---|
| X | Immediate (Acute) Health Hazard |
| - | Delayed (Chronic) Health Hazard |
| - | Fire Hazard |
| - | Sudden Release of Pressure Hazard |
| - | Reactive Hazard |

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :
NSF Registration number for this product is : 114207
This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas. This product is acceptable for treating boilers, steam lines, and/or cooling systems (G7) where neither the treated water nor the steam produced may contact edible products in and around food processing areas.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 1706-179
In all cases follow instructions on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation:

| Substance(s) | Citations |
|---|---|
| • Sodium Hydroxide | Sec. 311 |

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

| | |
|---|---|
| Sodium Hydroxide | 1310-73-2 |
| Sodium Hypochlorite | 7681-52-9 |

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

CHINA
All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

## 16. OTHER INFORMATION

Nalco: EHS2818, F105047/104688

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 02/28/2004
Version Number : 1.9

# MATERIAL SAFETY DATA SHEET

PRODUCT NAME: **CORCRAFT LIQUID BLEACH 12.5%**

EFFECTIVE DATE: 8/01/2002

ISSUED BY: Great Meadow/Washington Industries
NYS Division of Industry
PO Box 51
Comstock, NY 12821

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910 1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT

## I -PRODUCT IDENTIFICATION

Product Name: Sodium Hypochlorite
Synonyms: Liquid chlorine solution, Liquid bleach, Hypochlorite, Bleach, Hypo
Chemical Family: Hypochlorite
Formula: NaOCL in water
Use Description: textile/laundry bleaching agent, hard surface cleaner
Hazard Classification: Oxidizer, unstable (reactive), corrosive, lung toxin

## II - COMPONENT DATA

Product Composition
CAS or Chemical Name: Sodium Hypochlorite
CAS Number: 7681-52-9
Percentage Range: 7-15%
Hazardous Per 29 CFR 1910.1200: Yes
Exposure Standards: None Established for Sodium Hypochlorite, see Hazardous Decomposition, Sec. VII

CAS or Chemical Name: Water
CAS Number: 7732-18-5
Percentage Range. 70.5-87.5
Hazardous Per 29 CFR 1910.1200: No
Exposure Standards: None Established.

CAS or Chemical Name: Sodium hydroxide
CAS Number: 1310-73-2
Percentage Range: 0.5 - 2 5
Hazardous Per 29 CFR 1910.1200: Yes
Exposure Standards:

| | OSHA (PEL) * | | ACGIH(TLV) | |
|---|---|---|---|---|
| | ppm | mg/m 3 | ppm | mg/m 3 |
| TWA: | N/A | 2 | N/A | None |
| CEILING: | N/A | None | N/A | 2 |
| STEL: | N/A | None | N/A | None |

* Federal OSHA PEL. State OSHA PEL may be different.

CAS or Chemical Name. Sodium chloride
CAS Number: 7647-14-5
Percentage Range: 5.0 - 12 0

Hazardous Per 29 CFR 1910.1200: Yes
Exposure Standards: None Established

## III - PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY
AVOID CONTACT WITH SKIN OR EYES, UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER.
AVOID BREATHING MIST OR VAPOR.

**STORAGE CONDITIONS:**
Store in a cool, dry, well-ventilated area. Avoid high temperatures and exposure to and direct sunlight.
DO NOT STORE AT TEMPERATURES ABOVE: 15-21 Deg. C (60-70 Deg. F)
OTHER: Store in the dark at the lowest possible temperature, but keep from freezing.

**PRODUCT STABILITY AND COMPATIBILITY:**
SHELF LIFE LIMITATIONS: Up to 6 months at 60 Deg. F. or lower
INCOMPATIBLE MATERIALS FOR PACKAGING: Metal containers.
INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: Oxidizers, acids, nitrogen containing materials such as quaternary ammonium salts, metals such as copper, nickel or cobalt.

## IV -PHYSICAL DATA

Appearance: Greenish-yellow liquid
Freezing Point: -20 deg C @ 7% NaOCl
Boiling Point: Decomposes on heating
Decomposition Temperature: Decomposition rate increases as heated
Specific Gravity: 1.08 - 1.26
Bulk Density: Not Applicable
pH @20 deg C 12-14
Vapor Pressure @ 20 deg C: No Data
Solubility in Water: Miscible
Volatiles, Percent by Volume: 87.5-94.5
Evaporation Rate: No Data
Vapor Density: No Data
Molecular Weight: 74.5 (active ingredient-NaOCl)
Odor: Chlorine-like
Coefficient of Oil/Water Distribution: No Data

## V - PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

**Personal Protection for Routine Use of Product:**

### Respiratory Protection:

**Routine**: If vapors, mists, or aerosols are not controlled with ventilation to below the TLV wear a NIOSH approved respirator.

**Line breaking/hose connections/samples, etc.:** Wear a NIOSH approved workplace respirator as air concentrations above the TLV for chlorine may occur unexpectedly.

**Ventilation**

**Routine**. Local exhaust ventilation is recommended if vapors, mists or aerosols are generated. Otherwise, use general exhaust ventilation.

**Line breaking/hose connections/samples, etc.:** Use local exhaust ventilation

### Skin and Eye Protection:

**Routine**: Use chemical safety goggles and impermeable gloves.

**Line breaking/hose connections/samples, etc.:** Wear chemical safety goggles and face shield, impermeable gloves, boots and protective suit

**Other**: Emergency eye wash and safety showers must be provided in the immediate work area

## Equipment Specifications (When Applicable):

**Respirator Type**: NIOSH approved respirator equipped with chemical cartridges for protection against chlorine gas and dust mist pre-filters.

**Protective Clothing Type**. (This includes: gloves, boots, apron, protective suit.) Neoprene

## VI - FIRE AND EXPLOSION HAZARD INFORMATION

Flammability Data.

| | |
|---|---|
| Explosive: | N/A |
| Flammable: | No |
| Combustible: | No |
| Pyrophoric: | No |
| Flash Point. | Not Applicable |
| Auto Ignition Temperature: | Not Applicable |

Flammable Limits at Normal Atmospheric Temperature and Pressure (Percent Volume in Air):

| | |
|---|---|
| LEL - | Not Applicable |
| UEL - | Not Applicable |

NFPA Ratings

| | |
|---|---|
| Health: | Not Established |
| Flammability: | Not Established |
| Reactivity. | Not Established |

HMIS Ratings

| | |
|---|---|
| Health. | 3 |
| Flammability· | 0 |
| Reactivity: | 2 |

**Extinguishing Media**. Not applicable

**Fire Fighting Techniques and Comments**: Use water to cool containers exposed to fire On small fire, use dry chemical, carbon dioxide or water spray On large fires, use water in flooding quantities as fog. In case of fire, hazardous concentrations of chlorine may be formed. See Section XI for personal protective equipment for fire fighting.

## VII - REACTIVITY INFORMATION

**Conditions Under Which This Product May Be Unstable:**

Temperatures Above. Decomposition rate increases as it is heated

Mechanical Shock or Impact· No

Electrical (Static) Discharge: No

Other· Decomposition will result in formation of oxygen from contact with copper, nickel, cobalt and iron.

Hazardous Polymerization: Will not occur.

Incompatible Materials· Iron, copper, nickel, cobalt, acids, ammonium or other nitrogen containing compounds, organics, other oxidizers.

Hazardous Decomposition: Chlorine gas.

Other conditions to avoid: High heat, sunlight and ultra-violet light.

**Summary of Reactivity:**

| | |
|---|---|
| Explosive. | N/A |
| Oxidizer | Yes |
| Pyrophoric. | No |
| Organic Peroxide. | No |
| Water Reactive: | No |
| Corrosive: | N/A |

## VIII - FIRST AID

**Eyes:**
Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention at once.
**Skin:**
Immediately flush with water for at least 15 minutes Seek medical attention If clothing, shoes and/or jewelry come in contact with the product, they removed immediately and laundered before re-use **Ingestion:**
Immediately drink large quantities of water. DO NOT induce vomiting. Seek medical attention at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.
**Inhalation:**
If person experiences nausea, headache or dizziness, person should stop work immediately and move to fresh air until these symptoms disappear. If breathing is difficult, administer oxygen, keep the person warm and at rest. Seek medical attention. In the event that an individual inhales enough vapor to lose consciousness, person should be moved to fresh air at once and seek medical attention immediately. If breathing has stopped, artificial respiration should be given immediately. In all cases, ensure adequate ventilation and provide respiratory protection before he person returns to work.

## IX - TOXICOLOGY AND HEALTH INFORMATION

**Routes of Absorption Inhalation:** skin, eye, ingestion

**Warning Statements and Warning Properties:**

**CAUSES RESPIRATORY TRACT IRRITATION. CAUSES EYE AND SKIN BURNS. CAN CAUSE LUNG DAMAGE.**

**Human Threshold Response Data:**

**Odor Threshold**: Approximately 0 9 mg/M 3 (0.3 ppm) based on odor of chlorine.

**Irritation Threshold**· No data for Sodium hypochlorite. However, decomposition products may be irritating

**Immediately Danger to Life or Health** No Data. However, Sodium hypochlorite has the potential to be immediately dangerous to life or health

**Signs, Symptoms and Effects of Exposure:**

### Inhalation:

**Acute:** Inhalation of this material is irritating to the nose, mouth, throat and lungs. It may also cause burns to the respiratory tract with the production of lung edema, which can result in shortness of breath, wheezing, choking, chest pain, and impairment of lung function. Inhalation of high concentrations can result in permanent lung damage.

**Chronic**: Repeated inhalation exposure may cause impairment of lung function and permanent lung damage

### Skin:

**Acute:** Dermal exposure can cause severe irritation and/or burns characterized by redness, swelling and scab formation. Prolonged skin exposure may cause destruction of the dermis with impairment of the skin at site of contact to regenerate

**Chronic:** Effects from chronic skin exposure would be similar to those from single exposure except for effects secondary to tissue destruction.

### Eye:

Severe irritation and/or burns can occur following eye exposure Contact may cause impairment of vision and corneal damage.

### Ingestion:

**Acute:** Irritation and/or burns can occur to the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, bleeding, and/or tissue ulceration

**Chronic:** There are no known or reported effects from chronic exposure

Medical Conditions Aggravated by Exposure Asthma and respiratory and cardiovascular disease

Interactions with other chemicals which enhance toxicity none known or reported

**Animal Toxicology**
**Acute Target Organ Toxicity:**

| | |
|---|---|
| **INHALATION LC50** | No available data |
| **ORAL LD50.** | Approximately 3-5 g/kg (rat) |
| **DERMAL LD50** | > 2 g/kg (rabbit) Causes burn to eyes and skin. |

**Chronic Target Organ Toxicity:**
There are no know or reported effects from repeated exposure.
**Reproductive and Developmental Toxicity:** There are no known or reported effect; on reproductive function or fetal development
**Carcinogenicity:**
Sodium hypochlorite has been shown not to be carcinogenic in laboratory animals.
It is not included as a carcinogen by IARC, OSHA, NTP, or EPA. IARC has concluded that there is inadequate evidence for the carcinogenicity of hypochlorite salts in laboratory animal; and there is no data available from studies in humans Therefore, IARC considers hypochlorite salts to be not classifiable as to their carcinogenicity to humans.
**Mutagenicity:**
Sodium hypochlorite has been shown to produce damage to genetic material when tested in vitro. Studies in vivo have shown no evidence of mutagenic potential for this material. Chemicals with potent biocidal activity, typical of hypochlorite compounds, may compromise the integrity of many of the treated cells, which remain viable during an in vitro assay This result would likely produce cellular changes giving rise to a response indicative of mutation. It is judged that the risk of genetic damage is insignificant for sodium hypochlorite because of its biocidal activity, lack of mutagenicity in vivo, and failure to produce a carcinogenic response.
**Aquatic Toxicity:**
**Aquatic LC50** - approximately 0.6 mg/l (bluegill) approximately 1 mg/l (daphnia, 48 hours)

## X - TRANSPORTATION INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL
DOT Description from the Hazardous Materials Table 49 CFR 172.101.
Land (U S DOT) HYPOCHLORITE SOLUTIONS, 8, UN1791, PG II
Water (IMO) Same as above
Air (IATA/ICAO) Same as above
Hazard Label/Placard: CORROSIVE
Reportable Quantity 100 lbs (Per 49 CFR 172.101, Appendix)
Emergency Guide 154

## XI -SPILL AND LEAK PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300
**Reportable Quantity**: 100 LBS (Per 40 CFR 302.4)
**Spill Mitigation Procedures:**
Hazardous concentrations in air may be found in local spill area and immediately downwind.
**Air Release** Vapors may be suppressed by the use of a water fog. Capture all run-off water for treatment and disposal
**Water Release.** This material is soluble in water. Dike or contain material via use of compatible absorbents Remove material with use of vacuum or pump operation and treat before disposition. This material is harmful to aquatic life
**Land Spill**: Compatible absorbents Sand, clay soil, commercial absorbents.
**Spill Residues** Dispose of per guidelines under Section XII, WASTE DISPOSAL This material may be neutralized for disposal, you are requested to contact OCEAN at 888-289-1911 before beginning any such operation
**Personal Protection for Emergency Spill and fire fighting situations**: Response to this material requires the use of self-contained breathing apparatus (SCBA) Additional protective clothing must be worn to prevent

personal contact with this material. These items include by are not limited to boots, gloves, hard hat, and impervious clothing, i e. chemically impermeable suit. Compatible materials for response to this material are neoprene, butyl rubber, viton and saranex.

**XII - WASTE DISPOSAL**

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste number: D002. As a hazardous liquid waste, it must be disposed of in accordance with local state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by treatment. CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES

**XIII - ADDITIONAL REGULATORY STATUS INFORMATION**

**TOXIC SUBSTANCES CONTROL ACT**: This substance is listed on the Toxic Substances Control Act inventory.
**NSF LIMITS**: NSF Maximum Drinking Water Usage Concentration - 250 mg/l as sodium hypochlorite
**SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT TITLE III**: None Established
**HAZARD CATEGORIES, PER 40 CFR 370.2**:

| | |
|---|---|
| **HEALTH** | Immediate (Acute) |
| | Delayed (Chronic) |
| **PHYSICAL:** | |
| **FIRE:** | |
| **REACTIVITY:** | |

**EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW, PER 40 CFR 355, APP.A:** EXTREMELY HAZARDOUS SUBSTANCE
**THRESHOLD PLANNING QUANTITY**: None Established
**SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372-45:** None Established

FOR ADDITIONAL INFORMATION CONTACT: THE MSDS COORDINATOR AT CORCRAFT DURING BUSINESS HOURS, 7am – 3pm M-FEASTERN TIME @ (888) 697 6233

********** NOTICE **********

CORCRAFT EXPRESSLY DISCLAIMS ALL EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN, AND SHALL UNDER NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES WHILE THE INFORMATION IS BELIEVED TO BE ACCURATE, CORCRAFT MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR SUFFICIENCY CONDITIONS OF USE ARE BEYOND CORCRAFTS CONTROL AND THEREFORE USERS ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM THE PUBLICATION OR USE OF, OR RELIANCE UPON INFORMATION CONTAINED HEREIN THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER PROCESS

END OF MSDS